MEA 2016–2017

Science Grade 5

The table below shows the entire fifth grade science test design. Scores are based on common items only, half of which are released and can be found in this document.

Test Design

Content Area	Common		Field Test Items		Total Items per Student		Base Testing Time	Points
	MC	CR	MC	CR	MC	CR		
Science	32	4	8	1	40	5	90 min.	48

Each item on the MEA measures a content standard of Maine's 2007 *Learning Results*.

Science Content Standards Assessed on the MEA

D. The Physical Setting
1. Universe and Solar System
2. Earth
3. Matter and Energy
4. Force and Motion

E. The Living Environment
1. Biodiversity
2. Ecosystems
3. Cells
4. Heredity and Reproduction
5. Evolution

Item Information Chart

Please refer to the item information chart on the next page for in-depth information on each science released item. The released item numbers in the chart correspond to item numbers in the practice test and on the MEA Item Analysis Report.

Constructed-Response Scoring Guides

A constructed-response scoring guide includes score point descriptions used to determine the score. Training notes that follow the scoring guide provide in-depth descriptions or particular information also used to determine the score.

Student Work

At least one sample student response is provided for each score point with annotations that explain the reasoning behind the assigned score.

Grade 5 Science Released Item Information

Released Item Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Practice Test Page Number	2	2	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	9
Content Strand (Maine 2007 *Learning Results*)	E.3	E.4.a	E.4.b	D.3.e	D.2.b	D.1.a	E.2.d	D.3.a	D.3.b	E.2.e	D.4.c	E.2.a	D.3.c	D.1.a	E.3.a	E.3.b	E.5.a	D.4.d
Depth of Knowledge Code	2	2	2	2	2	2	2	2	2	3	1	2	3	1	1	2	3	3
Item Type	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	CR	CR
Possible Points	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4
Answer Key	C	D	B	B	A	A	C	B	B	A	B	C	D	B	A	B		
% Who Chose A or Earned 1 Point	8	8	1	1	74	47	36	28	14	63	20	2	7	7	90	20	11	22
% Who Chose B or Earned 2 Points	9	10	95	79	10	5	4	40	47	12	73	5	6	61	5	51	27	23
% Who Chose C or Earned 3 Points	74	12	1	13	15	13	23	19	16	11	6	84	7	21	2	11	35	32
% Who Chose D or Earned 4 Points	9	69	1	7	1	35	35	12	22	12	2	8	80	10	2	17	22	15
Statewide Average Student Score																	1.8	1.6

Content Strands: See "MDOE Regulation 132–*Learning Results: Parameters for Essential Instruction*" at http://www.maine.gov/education/lres/pei/index.html.

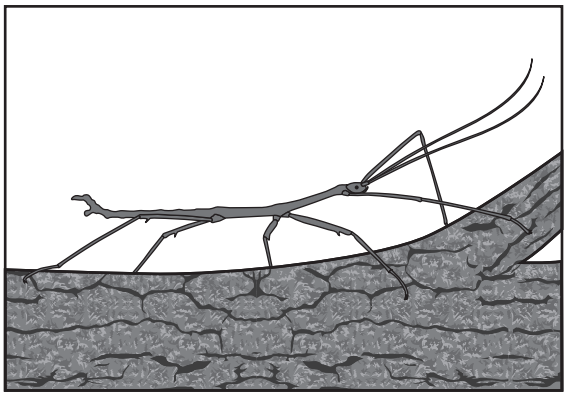
Item Type: MC = multiple choice, CR = constructed response

Answer Key: the letter of the correct answer choice

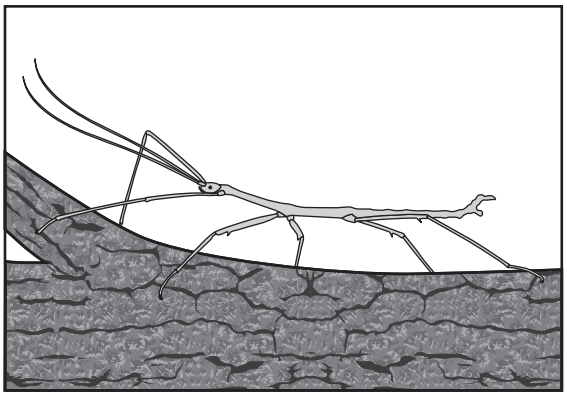
Constructed-Response Item 17

17 A walking stick is an insect that looks like a twig and feeds on leaves. In Maine it is usually pale green or dark brown, but it can also be brilliant green or blue in some parts of the world. When attacked by predators, it fakes its death.

Dark Brown



Pale Green



a. Based on the pictures, identify and explain which walking stick would **most likely** be a target for predators.

b. Describe whether a brilliant-colored walking stick would have an advantage or disadvantage for survival in the Maine forest. Explain your reasoning.

Be sure to label parts a and b in your answer booklet.

Scoring Guide for Constructed-Response Item 17

Score	Description
4	The response demonstrates a thorough understanding of the advantages and disadvantages gained when some individuals of the same kind are different in their characteristics and behavior. The response identifies and explains which walking stick would most likely be a target for predators and explains why there are so few brilliant-colored walking sticks in the Maine forest. The response has no errors or omissions.
3	The response demonstrates a general understanding of the advantages and disadvantages gained when some individuals of the same kind are different in their characteristics and behavior. The response has one error/omission overall.
2	The response demonstrates a limited understanding of the advantages and disadvantages gained when some individuals of the same kind are different in their characteristics and behavior. The response has two errors/omissions overall.
1	The response demonstrates a minimal understanding of the advantages and disadvantages gained when some individuals of the same kind are different in their characteristics and behavior. The response has one piece of correct information.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response.

Training Notes for Constructed-Response Item 17

a. Possible responses include:

- The light-colored walking stick because the color is different from its surroundings and therefore is easily seen.
- It isn't camouflaged and therefore is easily seen.

b. Possible response must include a discussion of how our Maine environment is largely green or brown, especially in the forests. A brilliantly colored walking stick, as are found in tropical areas, would be a target for predators because they are more easily seen and therefore more likely eaten.

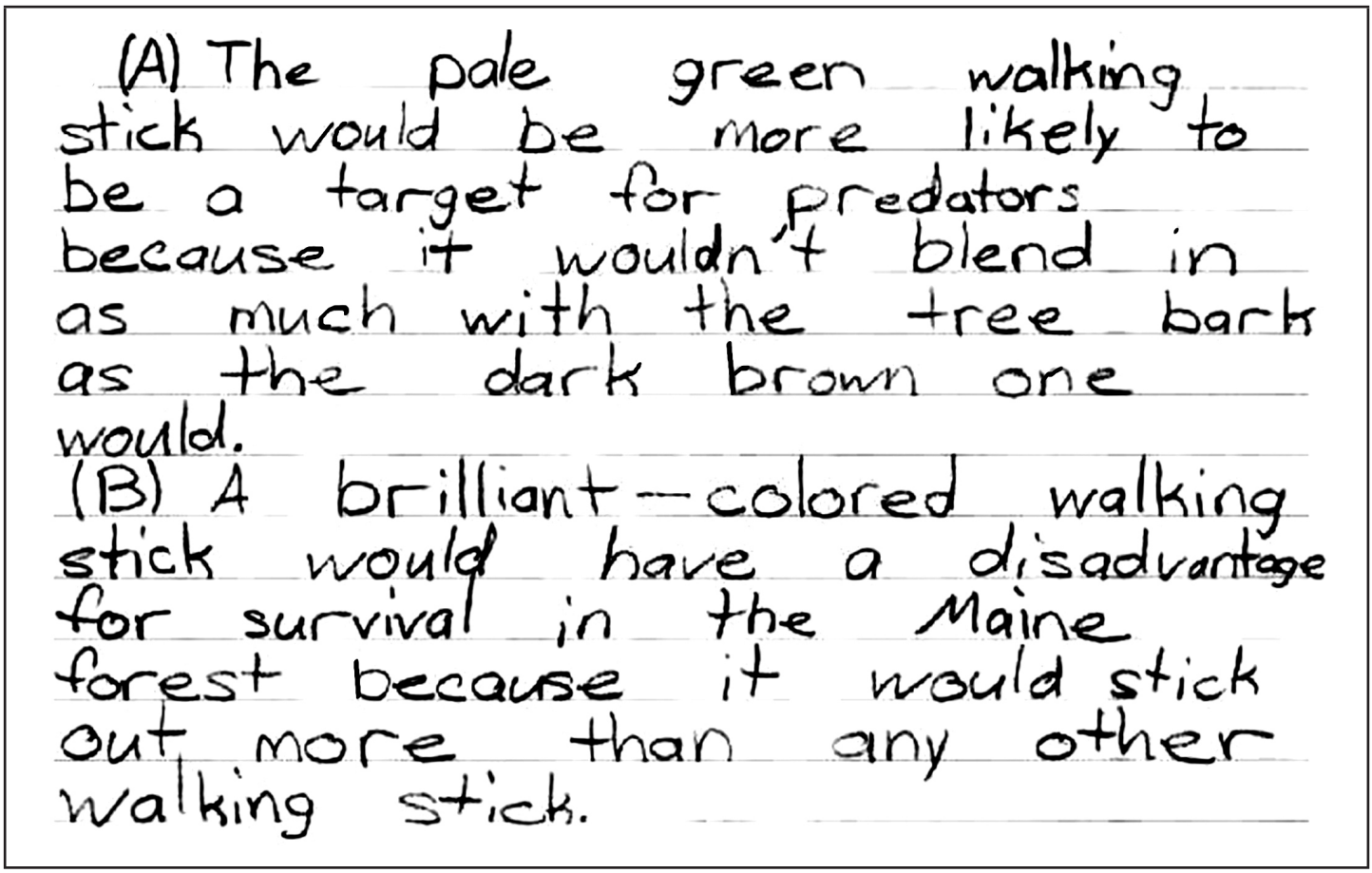
a) Based on the pictures, the pale green walking stick would most likely be a target for predators against a dark brown log. That is because, where the other one (dark brown) blends in to the color of the log, the green stands out. Though it blends in with other foliage, it cannot camouflage itself against a dark brown log.

b) A brilliant-colored walking stick would be at a disadvantage among the greens and browns of the Maine forest. That is because there is hardly anything brilliant blue or green in the Maine forest, and because it can't camouflage itself, it would be an easy target for predators. That is why a brilliant blue or green walking stick would be at a disadvantage for survival in the Maine forest.

Summary Annotation Statement:

Parts A and B are both correct, and both offer good supporting details.

Sample 3-Point Response with Annotations for Constructed-Response Item 17


(A) The pale green walking stick would be more likely to be a target for predators because it wouldn't blend in as much with the tree bark as the dark brown one would.
(B) A brilliant-colored walking stick would have a disadvantage for survival in the Maine forest because it would stick out more than any other walking stick.

Summary Annotation Statement:

Part A correctly identifies the pale green walking stick and correctly states that it wouldn't blend in as much as the dark brown walking stick. Part B is correct in stating that 'sticking out more' would occur but does not get to why the walking stick would stick out or why that would be a disadvantage.

Sample 2-Point Response with Annotations for Constructed-Response Item 17

a. The pale green walking stick because he doesn't blend in with the log like the Dark brown.
b. It would have a disadvantage because their blue and green. There wouldn't be much of a place to hide.

Summary Annotation Statement:

Part A correctly identifies the pale green walking stick and correctly states that it doesn't blend in. However, the response does not say specifically why the pale green stick would not blend in. Part B correctly states that there wouldn't be "much of a place to hide" for the pale green sticks but does not mention why.

Sample 1-Point Response with Annotations for Constructed-Response Item 17

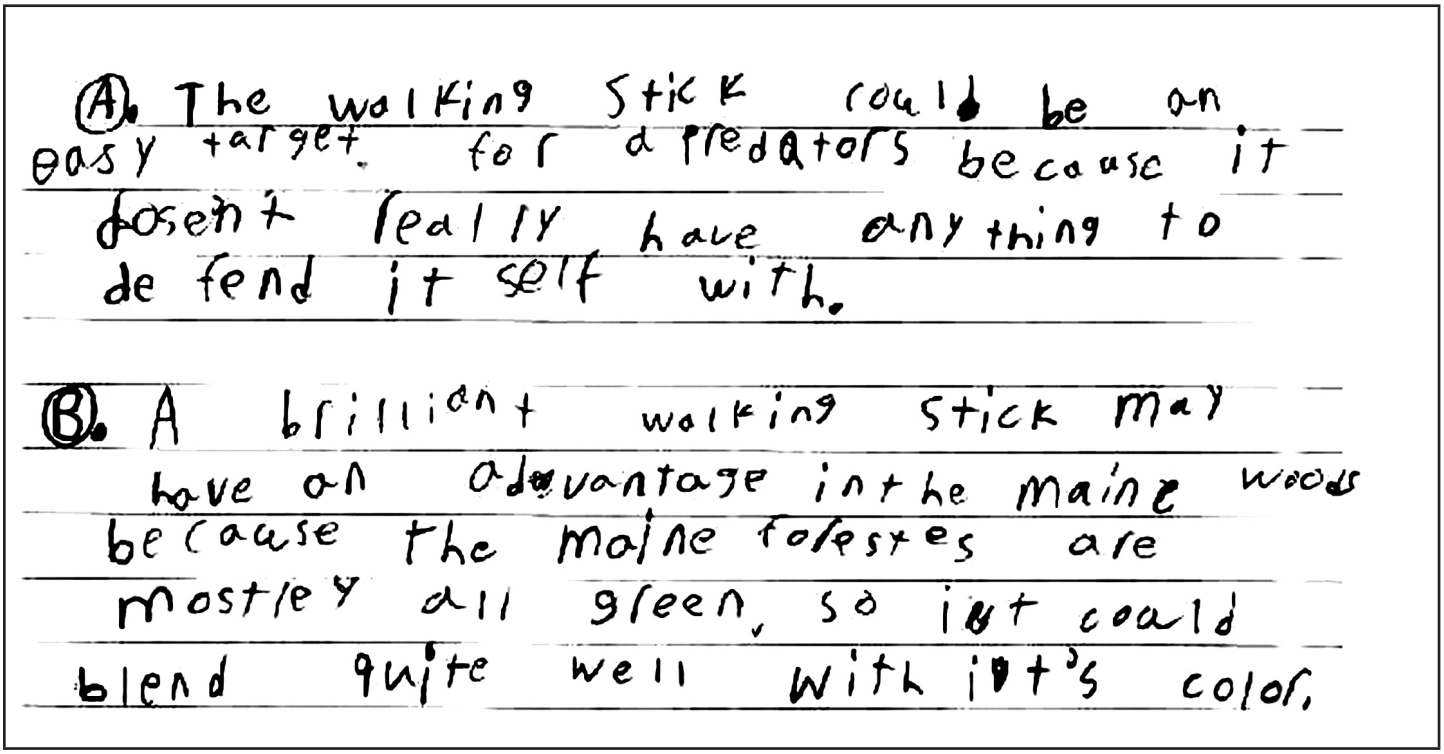
a. The pale green one because he doesn't look like wood.

b. He would have an advantage all the time except for winter.

Summary Annotation Statement:

Part A was awarded partial credit for the correct answer, but the student only provided minimal support.

Sample 0-Point Response with Annotations for Constructed-Response Item 17

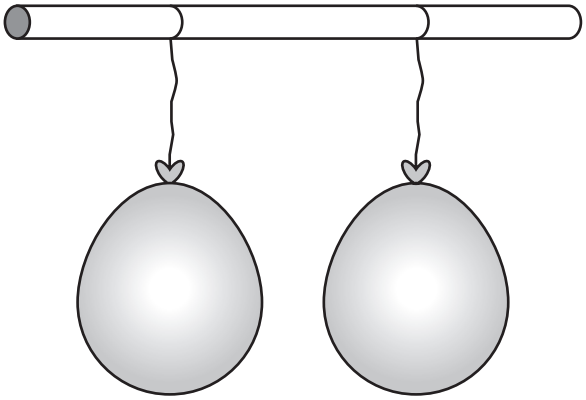


Summary Annotation Statement:

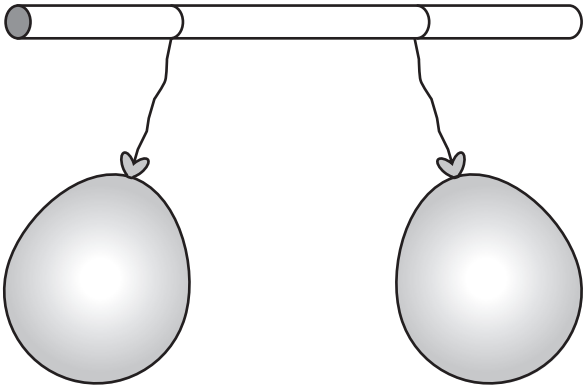
No credit was awarded here.

Constructed-Response Item 18

18 A student is investigating forces with balloons. First the student hangs two balloons next to each other on separate strings, as shown below.



Then the student rubs one balloon on a wool sweater. The result is shown in the diagram below.



a. Based on the diagrams, make a statement telling whether the changes in position of the balloons are due to gravity or some other force. Support your statement with evidence from the diagrams.

b. Describe another example of a force that can move objects without touching them **and** explain how this supports your statement in part a.

Be sure to label parts a and b in your answer booklet.

Scoring Guide for Constructed-Response Item 18

Score	Description
4	The student demonstrates a thorough understanding of how gravity, magnets, and electrically charged materials push and pull objects. The response describes that changes in position of the balloons are due to gravity or some other force and includes evidence from the diagrams AND generally describes forces that can move objects without touching them and how this connects to their statement in part a. The response has no errors or omissions.
3	The response demonstrates a general understanding of how gravity, magnets, and electrically charged materials push and pull objects. The response has one error/ omission overall.
2	The response demonstrates a limited understanding of how gravity, magnets, and electrically charged materials push and pull objects. The response has two errors/ omissions overall.
1	The response demonstrates a minimal understanding of how gravity, magnets, and electrically charged materials push and pull objects. The response has one piece of correct information.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response.

Training Notes for Constructed-Response Item 18

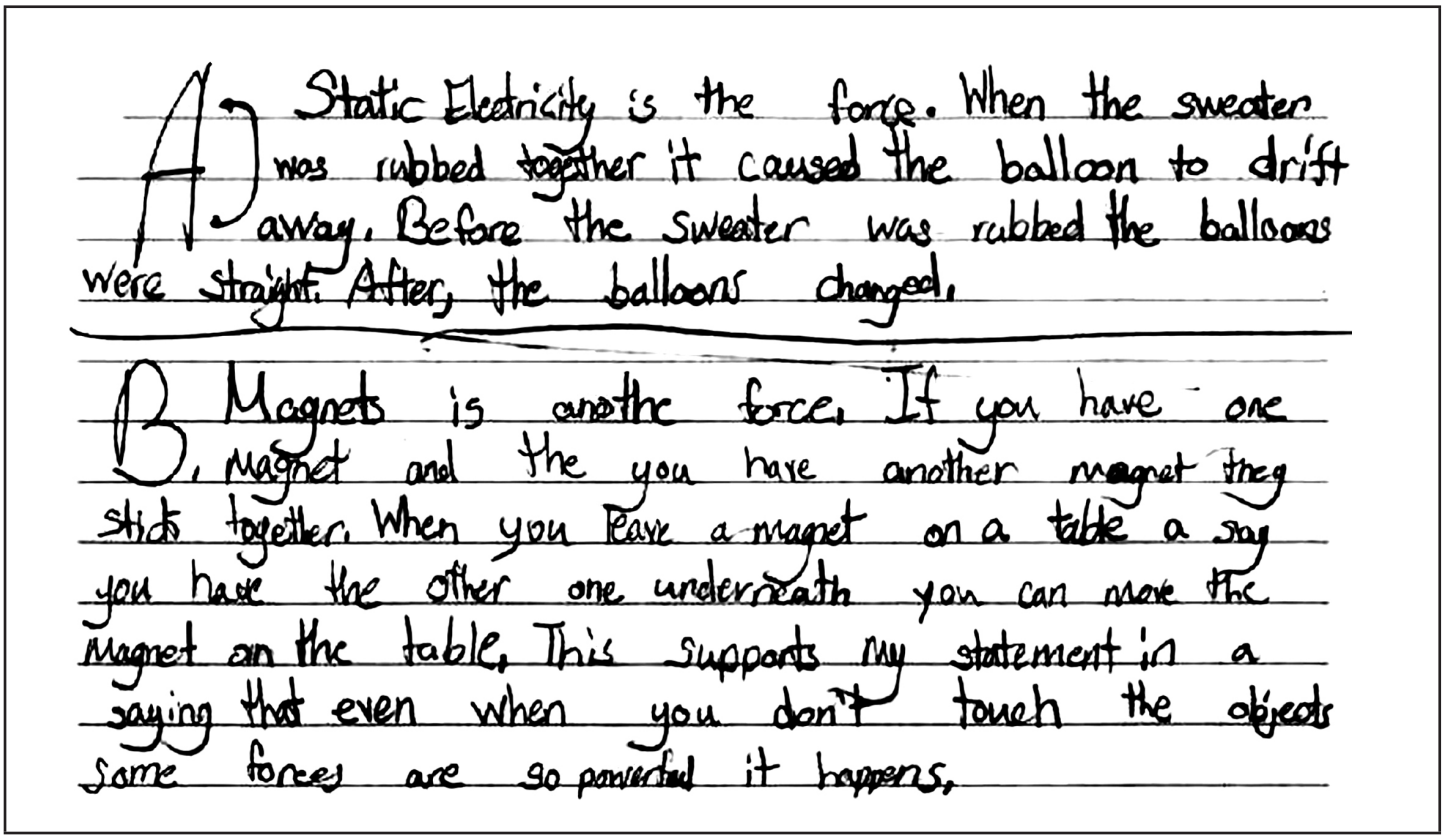
a. Possible responses include:

- The force is not gravity. Gravity pulls things down and the balloons are pushed apart.
- Static electricity because the force pushes the balloons apart.

b. Forces like gravity [magnets, electrostatic forces] can move objects without touching them. The two balloons are pushed apart by some force that is not touching them and therefore there is a push [repulsive] force.

Notes: Minimal credit for “not gravity” without an explanation for part A.

Sample 4-Point Response with Annotations for Constructed-Response Item 18

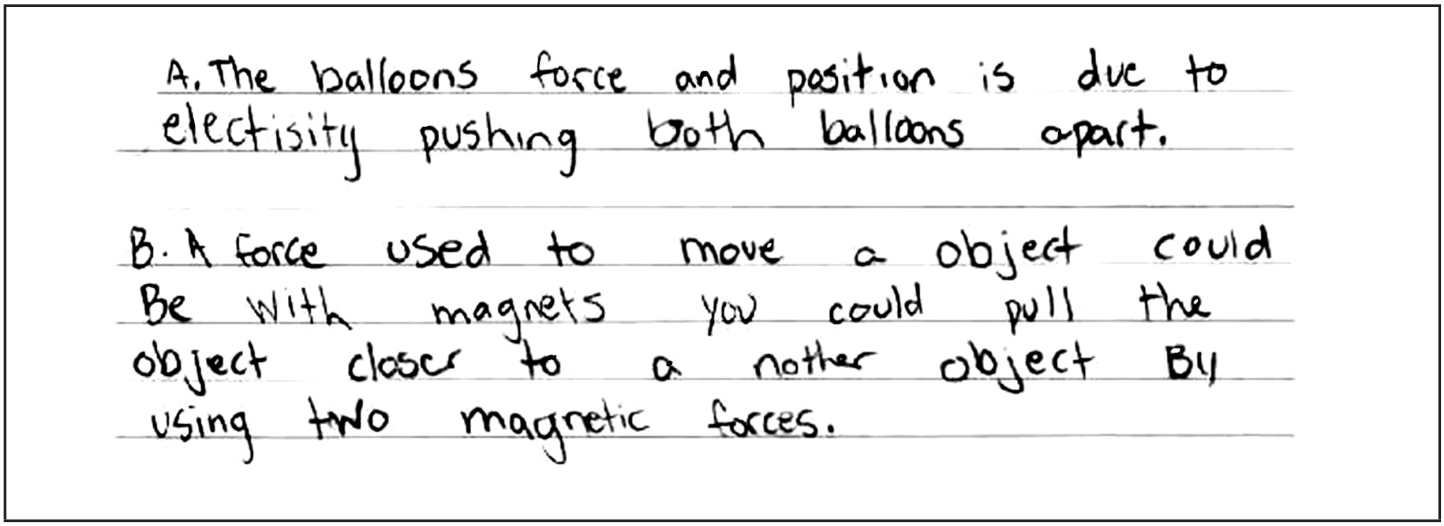

A Static Electricity is the force. When the sweater was rubbed ~~together~~ it caused the balloon to drift away. Before the sweater was rubbed the balloons were ~~straight~~. After, the balloons changed.

B. Magnets is ~~one~~the force. If you have one Magnet and the you have another magnet they ~~stick~~ together. When you leave a magnet on a table a say you have the other one underneath you can move the Magnet on the table. This supports my statement in a saying that even when you don't touch the objects some forces are so powerful it happens.

Summary Annotation Statement:

This answer is correct and was awarded full credit.

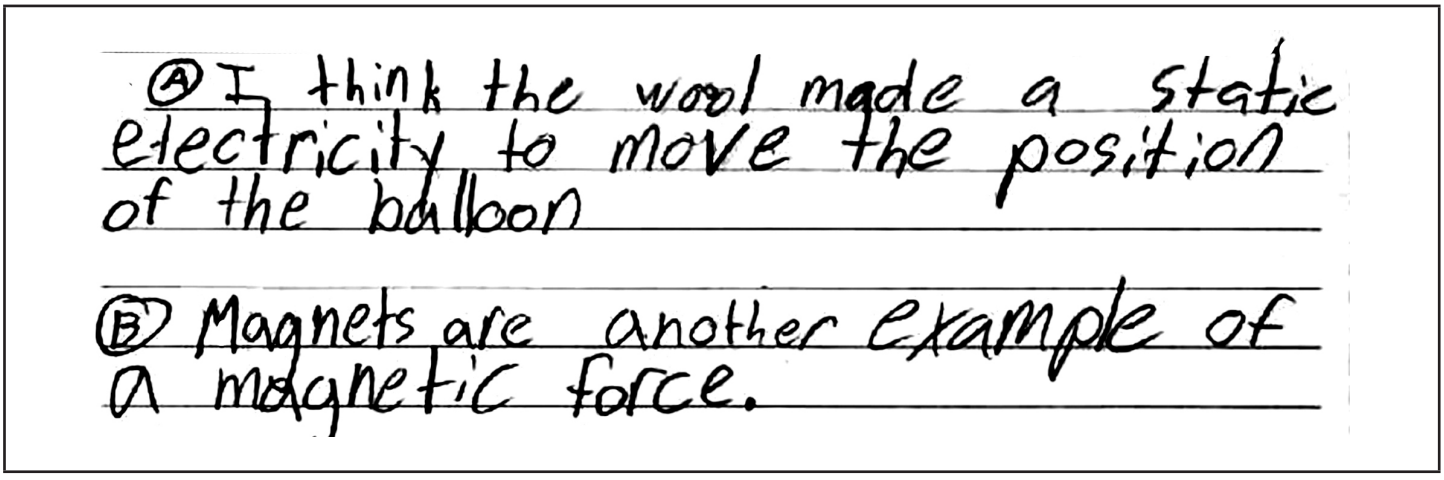
Sample 3-Point Response with Annotations for Constructed-Response Item 18



Summary Annotation Statement:

Part A correctly states that the force is electricity and that the balloons are being pushed apart. Part B correctly names magnetism as another force but does not link their response back to part A where the balloons are being pushed apart. Rather, the response discusses pulling two objects together.

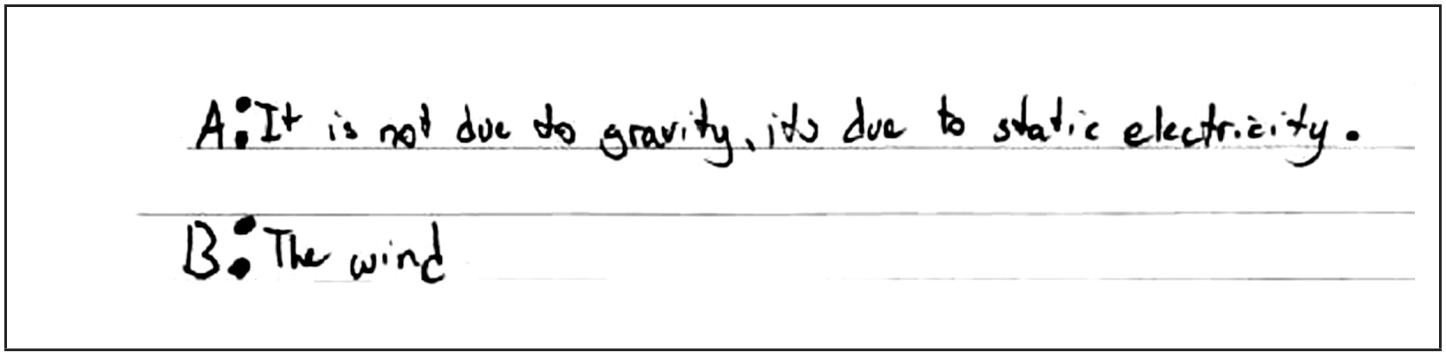
Sample 2-Point Response with Annotations for Constructed-Response Item 18



Summary Annotation Statement:

Parts A and B offer two answers without any support in either part.

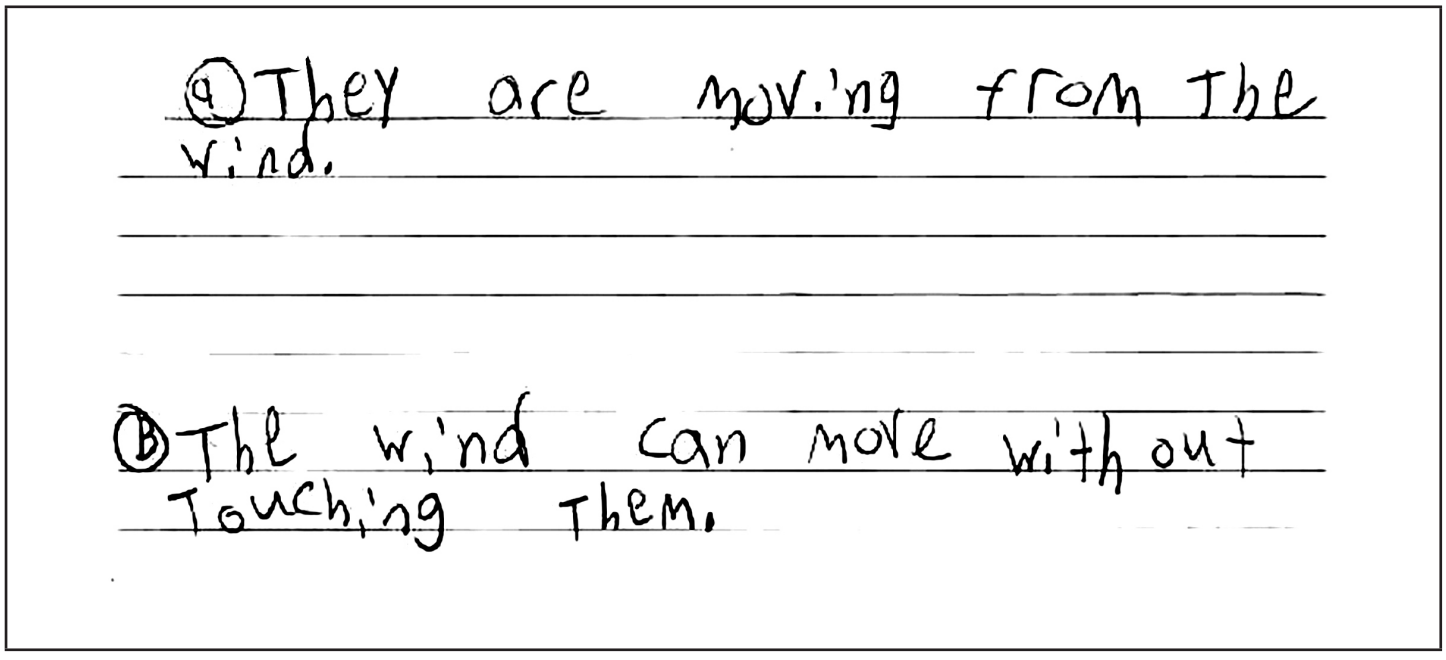
Sample 1-Point Response with Annotations for Constructed-Response Item 18



Summary Annotation Statement:

Part A offers an answer with no explanation. Part B does not provide sufficient information or an explanation to receive credit.

Sample 0-Point Response with Annotations for Constructed-Response Item 18



Summary Annotation Statement:

No credit was awarded here.